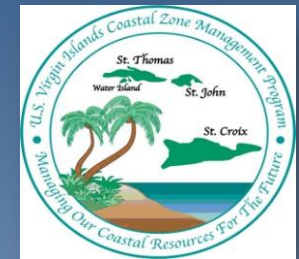
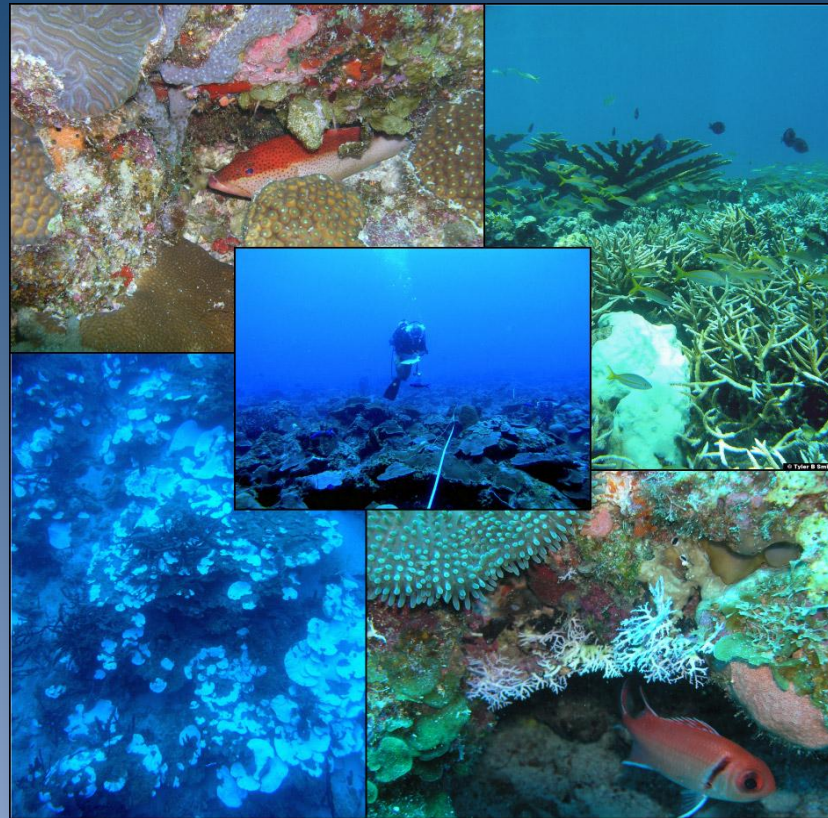


The United States Virgin Islands Territorial Coral Reef Monitoring Program



The Center for Marine and Environmental Studies, University of the Virgin Islands

Administered By: The Division of Coastal Zone Management, USVI Department of Planning and Natural Resources

Funded By: The Coral Reef Conservation Program, National Oceanic and Atmospheric



Initiated By: Coral Reef Conservation Act 2000

Objectives:

- Monitoring the status of coral reefs and reef fish communities across a variety of threats, including land-based sources of pollution, overfishing & thermal stress.
- Link changes in coral reef community health with specific stressors, indicating specific management actions
- Assess deep water (mesophotic) coral reef ecosystems and threatened species in the USVI



Sampling Design:

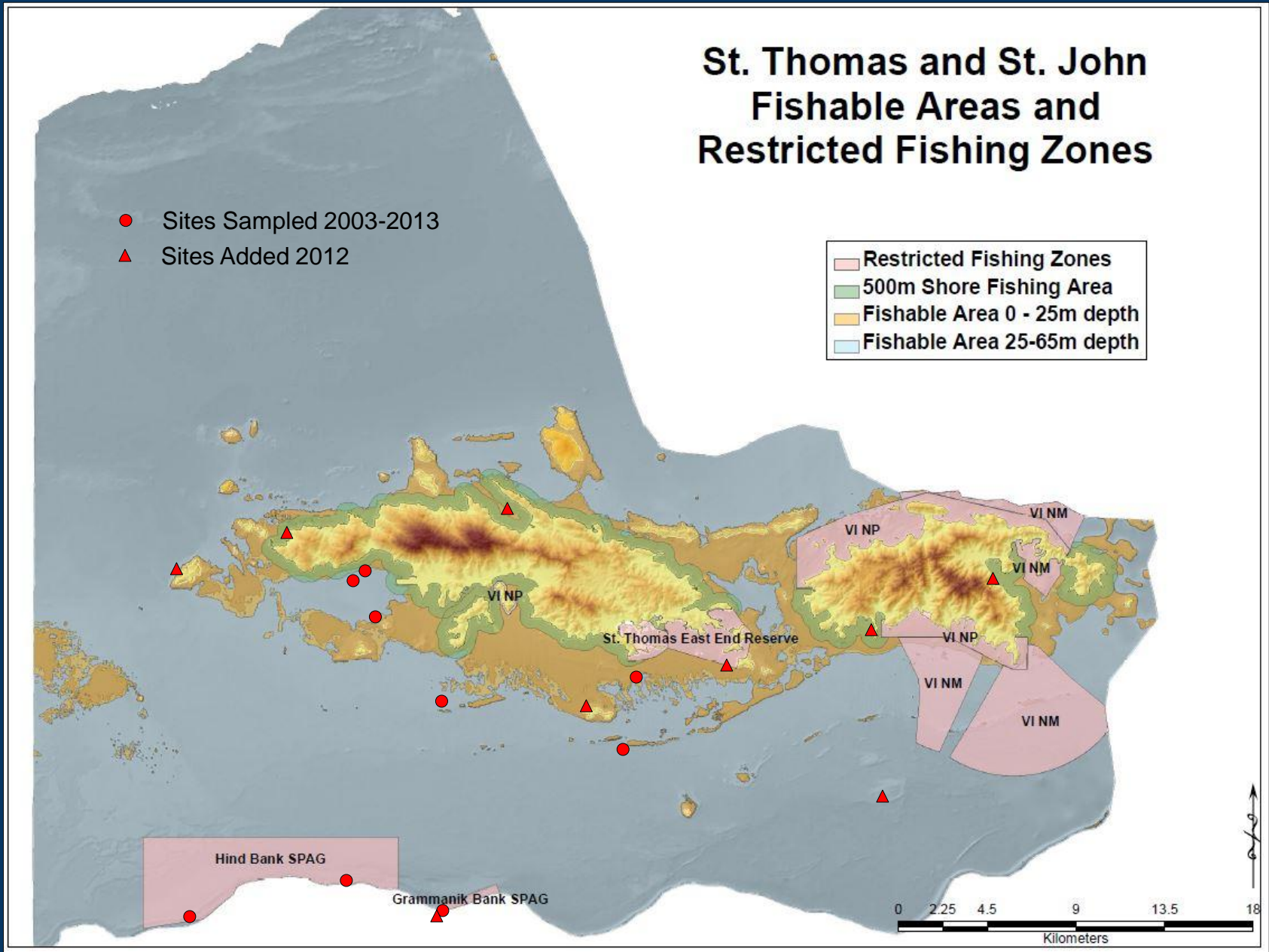
- Underwater Visual Census Surveys
- Fixed sites stratified by depth and proximity to shore
- 33 Total, 4-63m depth
- Annual Sampling
June-November

Fixed Site Locations: Northern USVI

St. Thomas and St. John Fishable Areas and Restricted Fishing Zones

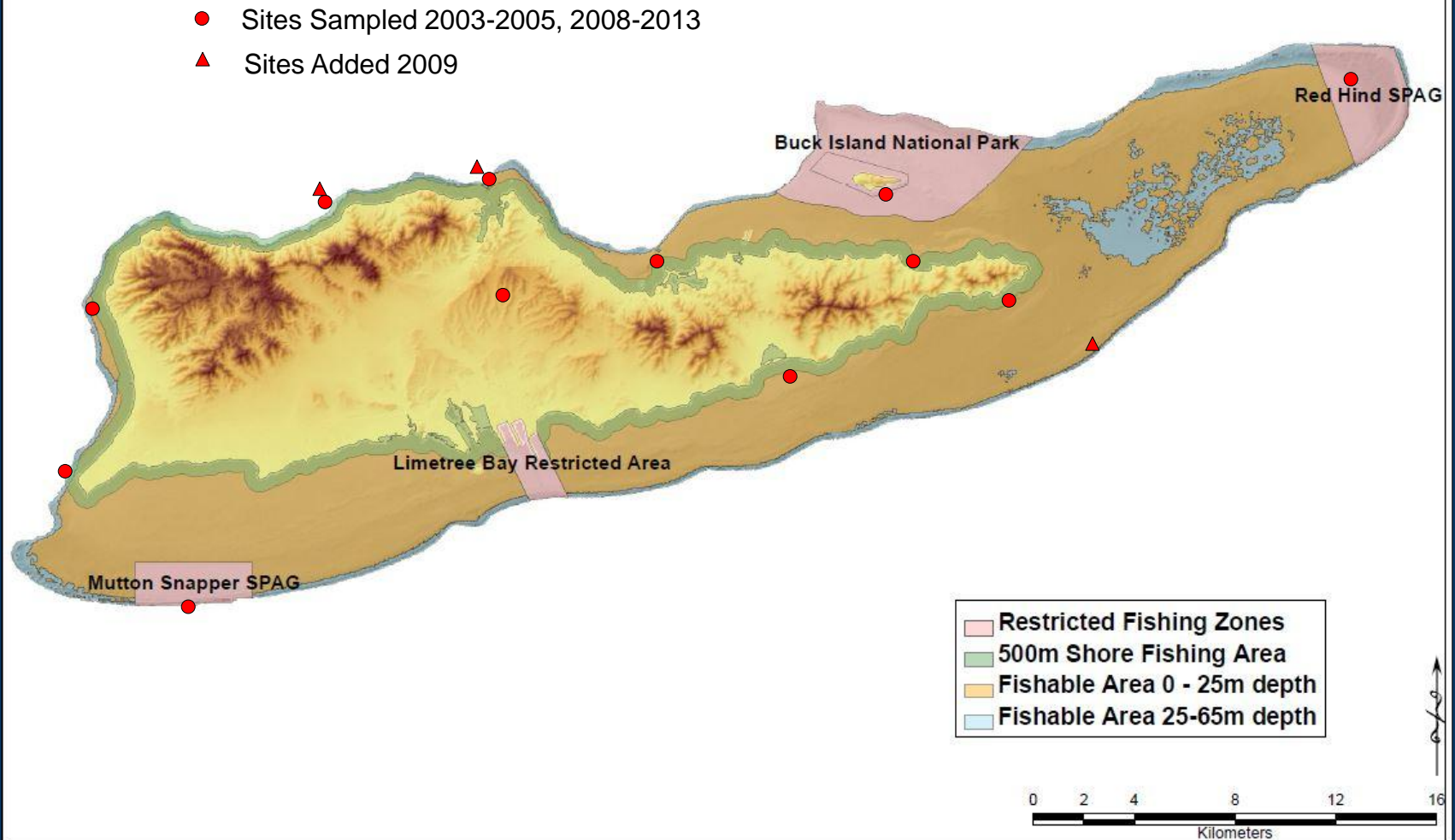
- Sites Sampled 2003-2013
- ▲ Sites Added 2012

- Restricted Fishing Zones
- 500m Shore Fishing Area
- Fishable Area 0 - 25m depth
- Fishable Area 25-65m depth



Fixed Site Locations: St. Croix

St. Croix Fishable Areas and Restricted Fishing Zones



Current Methodology

- Timed (15 min) 25 x 4m belt transects (100m²)
- 10 transects per site
- Random start and direction



- All species enumerated except gobies/blennies
- Fish measurements (cm TL) placed in 5 or 10 cm size bins. 0-5, 5-10, 10-20, 20-30, 30-40 etc.

Roving dives:

- 3 conducted per site (15 min > 25m depth, 30 min < 25m)
- Roving dives: Haphazard swim pattern
- Relative numbers of all species recorded: 0, 1-10, 11-100, 101-1000, > 1000
- Groupers, large snappers, hogfish and lionfish recorded individually by size

Changes in Methodology over time:

2003-2005: Six sites sampled annually in the northern USVI with additional 4 sampled biannually. 10 sites sampled in St. Croix.

Belt transects were 30 x 2m (60m²).

2006 and 2007: Lack of funding/personel prohibited sampling in St. Croix.

2008: Sampling resumed in St. Croix on 10 sites.

Belt transects changed to 25 x 4m (100m²) out for non-site attached species and 25 X 2m back for site attached (ie *Stegastes* spp, fairy basslets, wrasses and parrotfish < 5cmTL). Change made in order to capture larger fisheries species (in wider belt) while maintaining accuracy of enumerating small site attached species.

2009: Four deep water (mesophotic) sites added to St. Croix bringing site number to 14.

2010: Belt transects changed to 25 x4m (100m²) following standard NOAA methodology.

2012: Eight sites added to northern USVI bringing site number to 18, all done annually.

Methodology

- Data transcribed to Excel and Access databases
- Descriptive statistics calculated for reef fish community structure
- Roving dives used to report occurrences of rare species and invasive lionfish

Data Use

Annual Reports with raw and tabulated data noting changes in fish community structure over time and space:

https://www.researchgate.net/publication/259005675_The_United_States_Virgin_Islands_Territorial_Coral_Reef_Monitoring_Program_2011_Annual_Report?ev=prf_pub

Raw data available for ongoing ecological and fisheries studies



Evaluation and Limitations:

- **Spatial Coverage:** Program includes diverse hardbottom habitats on both island shelves. North side of St. Thomas offshore areas have not been sampled
- **Temporal Coverage:** Annual sampling has covered up to 10 years, however, it is once per year and may be seasonally biased
- **Methodology:** UVC produces an under-estimation of fish abundance and biomass.
- Commercial fisheries species are not common enough in the data set to for it's use as a primary tool for stock assessment or spawning stock biomass. Can be used for relative comparisons (e.g., encounter rates comparing island shelves).
- Sites were chosen that best represented the diversity of hardbottom and coral reef habitats in the USVI, but are not necessarily suitable habitat for fisheries species.